

**TELESCOPING PIVOT HINGE FOR
COMPUTER DISPLAY****CROSS-REFERENCE TO RELATED
APPLICATIONS**

Not applicable

**STATEMENT REGARDING FEDERALLY
SPONSORED RESEARCH OR DEVELOPMENT**

Not applicable

REFERENCE TO A MICROFICHE APPENDIX

Not applicable

BACKGROUND OF THE INVENTION**The Field of the Invention**

The present invention relates to a hinge device for notebook computers and other devices which comprise a manual input device housing and a visual display housing. In particular it relates to a hinge mechanism that provides means to control the angle of inclination, the vertical height and the horizontal distance between the manual input device housing and the visual display housing.

The ideal vertical elevation for a computer visual display for most users is several inches above the ideal elevation of a manual input device such as a keyboard or touchpad. Also the ideal horizontal position of the visual display is several inches behind the ideal horizontal position for manual input devices. Traditional desktop computers have manual input devices (keyboard and mouse) that are physically separate from the visual displays. This allows a user to position both the manual input device and the visual display in an optimum position to reduce stress and avoid repetitive stress injuries.

Small portable computers, including notebook computers, are becoming ever more popular. Notebook computers typically comprise two housings connected by a hinge. The first housing contains the actual computer (processor, memory and storage devices, etc.). This housing normally contains manual input devices such as a keyboard and a cursor control device. The first housing is referred to as the input housing below. The second housing contains a flat panel visual display. The second housing is referred to as the display housing below. The back of the input housing and the lower side of the display housing are typically connected by a hinge. The hinge allows the angle of inclination between the input housing and the display housing to be varied. The prior art hinges link the lower side of the display housing to the back of the input housing. When the input housing is in a position for comfortable keyboarding and cursor control, the display housing is too low for comfortable viewing. When the display housing is in a position for comfortable viewing, the input housing is too high for comfortable use. This can lead to fatigue and repetitive stress injuries. The greater the usage time, the more likely for users to experience fatigue and repetitive stress injuries.

Initially notebook computers were used mainly as secondary portable computers to provide limited computing capability when users were away from their traditional desktop computer. Notebook computers have become increasingly more powerful and have increasing larger and more usable visual displays. There is a trend for users to replace desktop personal computers with notebook computers. The usage time for notebook computers is increasing substantially. Many users are in danger of incurring repetitive stress injuries from extensive use of notebook computers.

The prior art contains several attempts to allow the vertical elevation and horizontal distance of the notebook computer display housing to be adjusted relative to the elevation and distance of the input housing.

U.S. Pat. No. 5,796,576 to Kim discloses a detachable hinge for the display housing. No means are provided for supporting the display when it is detached from the input housing. This design only addresses the problem of exchanging displays on notebook computers. It does not address the problem of adjusting the vertical elevation and horizontal distance of the display housing relative to the input housing during operation of the computer.

U.S. Pat. No. 5,629,832 to Sellers discloses a portable computer with a keyboard that is moveable relative to the main processor housing. This design does not allow the display housing to be elevated enough relative to the keyboard to avoid fatigue and repetitive stress injuries.

U.S. Pat. No. 5,548,478 to Kumar et al. discloses an adjustable hinge for a portable computer. The hinge allows the display housing to be flipped over to serve as a touch pad input device. The hinge does not allow the display housing to be elevated relative to the input housing.

U.S. Pat. No. 5,668,570 to Ditzik discloses a small transportable computer with a display housing that can be adjusted in vertical elevation and horizontal distance relative to the input housing. The design comprises three housings (a main processor housing, an input housing, and a display housing). The hinge attaches the lower side of the display housing to the front of the main processor housing. This design is not readily adaptable to notebook computers.

U.S. Pat. No. 5,815,735 to Baker discloses a notebook computer display housing which is detachable from the input housing and a separate pivot arm display support. The display support requires the display housing to be detached from the input housing in order to adjust the vertical elevation and horizontal distance of the display housing relative to the input housing. The separate display support must be available at each location where a user wants to adjust the vertical elevation and horizontal distance of the display housing relative to the input housing. This requires the user to either transport the display support along with the notebook computer, or keep a support at each location where the computer is used.

U.S. Pat. No. 5,805,415 to Tran et al. discloses a detachable hinge and a separate support for the display housing. The hinge and support requires the display housing to be detached from the input housing in order to adjust the vertical elevation and horizontal distance of the display housing relative to the input housing. The separate support must be available at each location where a user wants to adjust the vertical elevation and horizontal distance of the display housing relative to the input housing. This requires the user to either transport the support along with the notebook computer, or keep a support at each location where the computer is used.

What is needed is a hinge system for a notebook computer, or similar device, that allows the angle of inclination, the vertical elevation and the horizontal distance of the display housing to be adjusted relative to the input housing without the use of a separate support.

BRIEF SUMMARY OF THE INVENTION

The present invention relates to a telescoping pivot hinge system for a notebook computer or similar electronic device that allows the angle of inclination and the vertical elevation of the visual display housing to be adjusted relative to the